



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0094; Project Identifier AD-2021-01251-E; Amendment 39-22052; AD 2022-11-02]

RIN 2120-AA64

Airworthiness Directives; CFM International, S.A. Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all CFM International, S.A. (CFM) LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 model turbofan engines. This AD was prompted by the detection of melt-related freckles in the billet, which may reduce the life of certain compressor rotor stages 6-10 spools, high pressure turbine (HPT) rotor mid seals, HPT rotor stage 2 disks, low pressure turbine (LPT) stage 2 disks, and LPT stage 3 disks. This AD requires revising the airworthiness limitations section (ALS) of the applicable CFM LEAP-1B Engine Shop Manual (ESM), and the operator's existing approved maintenance or inspection program, as applicable, to incorporate reduced life limits for these parts. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For service information identified in this final rule, contact CFM International, S.A., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH, 45125; phone: (877) 432-3272; email: fleetsupport@ge.com. You may

view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0094.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0094; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; email: Mehdi.Lamnyi@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all CFM LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 model turbofan engines. The NPRM published in the *Federal Register* on February 15, 2022 (87 FR 8434). The NPRM was prompted by the engine manufacturer notifying the FAA of the detection of melt-related freckles in the billet, which may reduce the life of certain compressor rotor stages 6-10 spools, HPT rotor mid seals, HPT rotor stage 2 disks, LPT stage 2 disks, and LPT stage 3 disks (life-limited parts (LLPs)). The manufacturer's investigation determined that, as a result of such freckles forming in the billet, these LLPs may have undetected subsurface anomalies that developed during the manufacturing process, resulting in reduced material properties and a lower fatigue life capability. Reduced material properties may cause premature LLP fracture, which could result in uncontained

debris release. As a result of its investigation, the manufacturer determined the need to reduce the life limits of these LLPs. To reflect these reduced life limits, the manufacturer revised the CFM ALS, Chapter 05 of LEAP-1B ESM. Additionally, the manufacturer published service information that specifies procedures for the removal and replacement of these LLPs before reaching their new life limits. In the NPRM, the FAA proposed to require revising the ALS of the CFM LEAP-1B ESM, as applicable to each affected engine model, and the operator's existing approved maintenance or inspection program, as applicable, to incorporate reduced life limits for certain LLPs. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from four commenters. The commenters were Air Line Pilots Association, International (ALPA), American Airlines (AA), CFM, and United Airlines (UAL). The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to Update Service Information Revisions

CFM requested that the FAA update the service information issue numbers and dates to reflect the current revisions.

The FAA agrees and updated the service information issue numbers and dates throughout this AD. The FAA also added a Credit For Previous Actions paragraph to this AD, allowing operators to take credit for required actions if accomplished prior to the effective date of this AD using prior versions of the service information. This change imposes no additional burden on operators who are required to comply with this AD.

Request to Include Future Revisions to Service Information

AA and UAL requested that the FAA revise the required actions of the AD to allow the use of future approved revisions of the specified service information. AA added that when the FAA publishes an AD that incorporates an EASA AD by reference, the EASA AD includes language stating the use of later revisions is acceptable for compliance. AA suggested that since the FAA already approves future approved

revisions of documents that are incorporated by reference in a foreign AD, it is reasonable and logical that this FAA AD allows future approved revisions.

The FAA disagrees with revising the required actions of this AD to allow for the use of future approved revisions of the service information. Future revisions of the service information have not yet been published by the manufacturer or reviewed by the FAA. In the case of a foreign AD incorporated by reference in an FAA AD, the service information referenced by EASA is a second-tier document. A request for an alternative method of compliance can be submitted to the FAA if future revisions of the service information referenced in paragraph (g) of this AD are published. Additionally, if future revisions of the service information are published by the manufacturer and approved by the FAA, the FAA may consider further rulemaking.

Request to Clarify the Intent of the AD

AA requested the FAA clarify if the AD requires the incorporation of the LLP life limits in CFM Service Bulletin (SB) LEAP-1B-72-00-0342-01A-930A-D, Issue 002-00, dated July 26, 2021 (CFM SB LEAP-1B-72-00-0342-01A-930A-D), identified in Other Related Service Information, or if the AD requires revisions to the ESM.

The FAA notes that this AD does not require any actions using CFM SB LEAP-1B-72-00-0342-01A-930A-D. This AD requires only revising the ALS of the applicable CFM LEAP-1B ESM, and the operator's existing approved maintenance or inspection program, as applicable, to incorporate reduced life limits for these parts using CFM High Pressure Compressor Rotor Life Limits LEAP-1B-05-11-02-01A-0B1B-C, Issue 010-00, dated March 17, 2022, CFM High Pressure Turbine Rotor Life Limits LEAP-1B-05-11-03-01A-0B1B-C, Issue 007-00, dated March 17, 2022, and CFM Low Pressure Turbine Rotor Life Limits LEAP-1B-05-11-04-01A-0B1B-C, Issue 008-00, dated February 16, 2022. The revised life limits include references to CFM SB LEAP-1B-72-00-0342-01A-930A-D for lists of specific part serial numbers.

Support for the AD

ALPA expressed support for the AD as written.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Related Service Information under 1 CFR Part 51

The FAA reviewed the following service information:

- CFM High Pressure Compressor Rotor Life Limits LEAP-1B-05-11-02-01A-0B1B-C, Issue 010-00, dated March 17, 2022 (CFM LEAP-1B-05-11-02-01A-0B1B-C). CFM LEAP-1B-05-11-02-01A-0B1B-C provides the new life limits for the high pressure compressor rotor.
- CFM High Pressure Turbine Rotor Life Limits LEAP-1B-05-11-03-01A-0B1B-C, Issue 007-00, dated March 17, 2022 (CFM LEAP-1B-05-11-03-01A-0B1B-C). CFM LEAP-1B-05-11-03-01A-0B1B-C provides the new limits for the high pressure turbine rotor.
- CFM Low Pressure Turbine Rotor Life Limits LEAP-1B-05-11-04-01A-0B1B-C, Issue 008-00, dated February 16, 2022 (CFM LEAP-1B-05-11-04-01A-0B1B-C). CFM LEAP-1B-05-11-04-01A-0B1B-C provides the new life limits for the low pressure turbine rotor.

This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Other Related Service Information

The FAA reviewed CFM SB LEAP-1B-72-00-0342-01A-930A-D. CFM SB LEAP-1B-72-00-0342-01A-930A-D specifies procedures for removing and replacing the LLPs, and provides new life limits for certain serial numbers of the LLPs.

Costs of Compliance

The FAA estimates that this AD affects 378 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Revise ALS of the ESM and the operator's existing approved maintenance or inspection program	1 work-hour x \$85 per hour = \$85	\$0	\$85	\$32,130

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

2022-11-02 CFM International, S.A.: Amendment 39-22052; Docket No. FAA-2022-0094; Project Identifier AD-2021-01251-E.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to CFM International, S.A. (CFM) LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 model turbofan engines.

(d) Subject

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section, and JASC Code 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by the detection of melt-related freckles in the billet, which may reduce the life of certain compressor rotor stages 6-10 spools, high pressure turbine (HPT) rotor mid seals, HPT rotor stage 2 disks, low pressure turbine (LPT) stage 2 disks, and LPT stage 3 disks. The FAA is issuing this AD to prevent the failure of the high pressure compressor, HPT rotor, and LPT rotor. The unsafe condition, if not addressed, could result in release of uncontained debris, damage to the engine, and damage to the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

Within 60 days after the effective date of this AD, revise the airworthiness limitations section (ALS) of the applicable CFM LEAP-1B Engine Shop Manual (ESM) and the operator's existing approved maintenance or inspection program, as applicable, by incorporating the following service information:

(1) CFM High Pressure Compressor Rotor Life Limits LEAP-1B-05-11-02-01A-0B1B-C, Issue 010-00, dated March 17, 2022; and

(2) CFM High Pressure Turbine Rotor Life Limits LEAP-1B-05-11-03-01A-0B1B-C, Issue 007-00, dated March 17, 2022; and

(3) CFM Low Pressure Turbine Rotor Life Limits LEAP-1B-05-11-04-01A-0B1B-C, Issue 008-00, dated February 16, 2022.

(h) Credit for Previous Actions

(1) You may take credit for the action required by paragraph (g)(1) of this AD if the following service information was incorporated into the ALS of the applicable ESM and the operator's existing approved maintenance or inspection program, as applicable, prior to the effective date of this AD: CFM High Pressure Compressor Rotor Life Limits LEAP-1B-05-11-02-01A-0B1B-C, Issue 009-00, dated July 26, 2021.

(2) You may take credit for the action required by paragraph (g)(2) of this AD if the following service information was incorporated into the ALS of the applicable ESM and the operator's existing approved maintenance or inspection program, as applicable,

prior to the effective date of this AD: CFM High Pressure Turbine Rotor Life Limits LEAP-1B-05-11-03-01A-0B1B-C, Issue 006-00, dated July 26, 2021.

(3) You may take credit for the action required by paragraph (g)(3) of this AD if the following service information was incorporated into the ALS of the applicable ESM and the operator's existing approved maintenance or inspection program, as applicable, prior to the effective date of this AD: CFM Low Pressure Turbine Rotor Life Limits LEAP-1B-05-11-04-01A-0B1B-C, Issue 006-00, dated June 1, 2021, or Issue 007, dated February 15, 2022.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office

(j) Related Information

For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; email: Mehdi.Lamnyi@faa.gov.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) CFM High Pressure Compressor Rotor Life Limits LEAP-1B-05-11-02-01A-0B1B-C, Issue 010-00, dated March 17, 2022.

(ii) CFM High Pressure Turbine Rotor Life Limits LEAP-1B-05-11-03-01A-0B1B-C, Issue 007-00, dated March 17, 2022.

(iii) CFM Low Pressure Turbine Rotor Life Limits LEAP-1B-05-11-04-01A-0B1B-C, Issue 008-00, dated February 16, 2022.

(3) For service information identified in this AD, contact CFM International, S.A., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH, 45125; phone: (877) 432-3272; email: fleetsupport@ge.com.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on May 13, 2022.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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